

09/720841

The erythromycin PKS

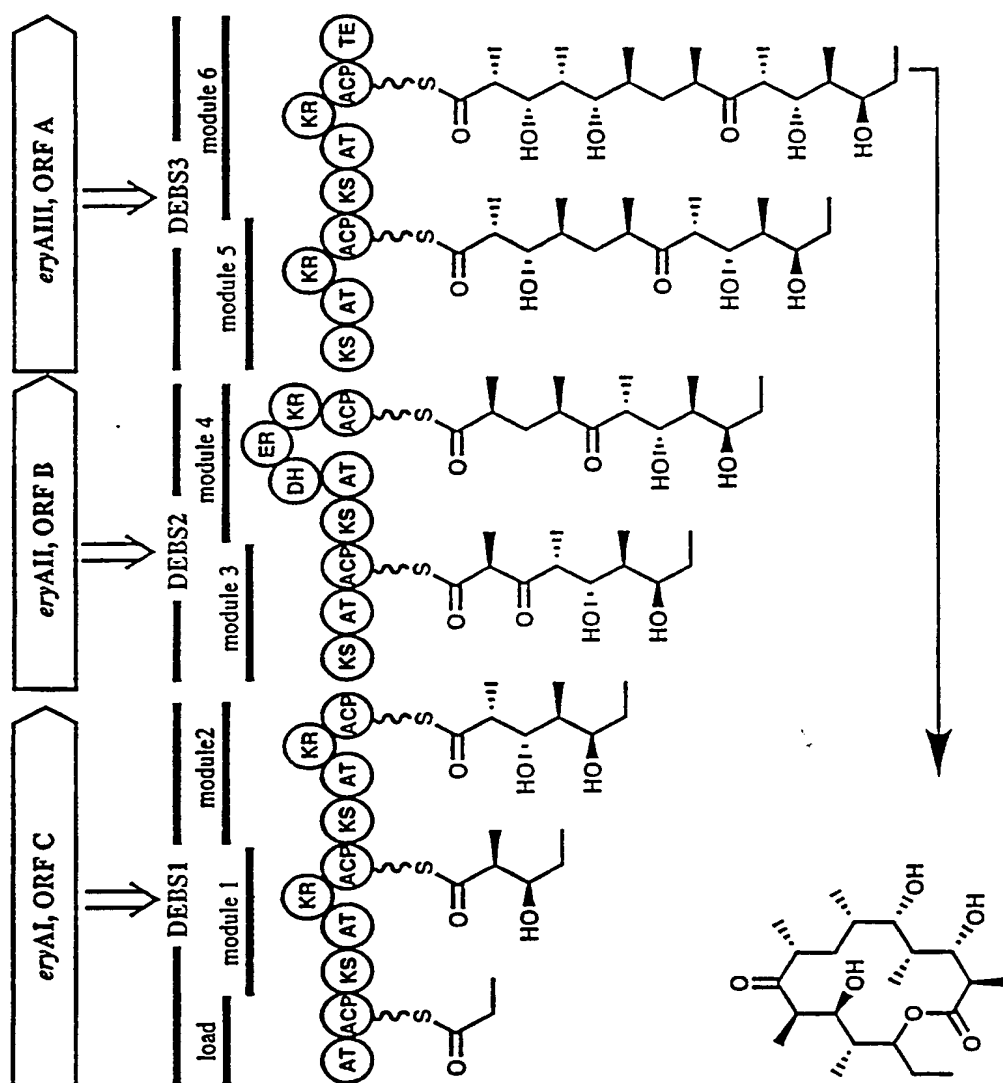


Fig. 1

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KCLFDAU
KCLFPEU
KCLFACT
KCLFHIR
KCLFGRA
KCLFNOG
KCLFTCM
KCLFCIN
KCLFVNZ
KCLFWHIE
KSGRA
KSHIR
KSACT
KSCIN
KSVNZ
KSNOG
KSTCM
KSDAU
KSPEU
KSWHI

-----MVTGLGIVAPNGLGVGAIWDAVLNNGRNGIGPLR
MTGTAARTASSQLHASPAGRRGLRGRAVVTGLGIVAPNGLGVGAYWDAVLNNGRNGIGPLR
-----MSVLITGVGVVAPNGLGLAPYWSAVLDGRHGLGPVT
-----MSTWVTGMGVVAPNGLGADDHWAATLKGRHGISRLS
-----MSTPDRRRRAVVTGLSVAAPGGLGTERYWKSLLTGENGLAELS
-----MTAAVVVTGLGVVAPTGLGVREHWSSTVRGASAIGPVT
-----MSAPAPVVVTGLGIVAPNGTGTEEYWAATLAGKSGIDVIO
-----MTP-VAVTGMGLAAPNGLGRPTTGRPPWAPRAASAAT
-----MSASVVVTGLGVAAPNGLGREDFWASTLGKSGIGPLT
-----MSGPQRTGTGGSSRAVVTGLGVLSPHGTGVEAHKAVADGTSLSGPVT
-----MTRRVVITGVGVRAVPPGSGTKEFWDLLTAGRTATRPIS
-----MTRRVVITGVGVRAVPPGLGAKNFWELLTSGRTATRRIS
-----MKRRVVITGVGVRAVPPGNGTRQFWELLTSGRTATRRIS
-----MTQRRVAITGIEVLAPGGLGRKEFWQLLSEGRATATRGIT
-----MTARRVVITGIEVLAPGGTGSKAFWNLLSEGRATATRGIT
-----MKESINRRVVITGIGIVAPDATGVKPFWDLLTAGRTATRTIT
-----MTRHAEKRVVITGIGVRAVPPGAGTAADFWDLLTAGRTATRTIS
-----MNRVVITGMGVVAPGAIGIKSFWELLLSGTTATRAIT
-----MNRIVITGIGVAPGAVGTPKFWELLLSGTTATRAIS
-----MTRRRVAVTGIGVAPGGIGTPQFWELLSEGRATATRRIS

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KCLFDAU
KCLFPEU
KCLFACT
KCLFHIR
KCLFGRA
KCLFNOG
KCLFTCM
KCLFCIN
KCLFVNZ
KCLFWHIE
KSGRA
KSHIR
KSACT
KSCIN
KSVNZ
KSNOG
KSTCM
KSDAU
KSPEU
KSWHI

RFADDGRLGRLAGEVSDFVP-EDHLPKRLLVQTDPMQMTALAAAEWALREAGCAPSS--
RFTGDGRLGRLAGEVSDFVP-EDHLPKRLLAQTDPMQY-ALAAAEWALRESGCSPSS--
RFDVSRYPATLAGQIDDFHA-PDHI PGRLLPQTD PSTRL-ALTAADWALQDAKADPES-L
RFDPTGYPAELAGQVLD FDA-TEHLPKRLLPQTDVSTRF-ALAAAWALADA EVDPAE-L
RFDASRYPSRLAGQIDDFEA-SEHLPKRLLPQTDVSTRY-ALAAADWALADAGVGPESGL
RFDAGRYPSKLAGVPGFVP-EDHLPKRLLPQTDHMTL-ALVAADWAFQDAAVDP SK-L
RFDPHGYPV RVGGEVLAFDA-AAHLPGRLLPQTD RMTQH-ALVAAEWALADAGLEPEK-Q
RFDPSGYPAQLAGEIPGFRA-AEHLPGRLVPQTD RVT RL-SLAAADWALADAGVEVAA-F
RFDPTGYPARLAGEVPGFAA-EEHLPKRLLPQTD RMTL-ALVAADWALADAGVRPEE-Q
REGCAHLPLRVAGEVHG FDA-AETVEDRFLVQTD RFTHF-ALSATQH ALADARFGRADVD
FFDASPFRSRIAGEI-DFDAVAEGFSPREVRMDRATQF-AVACTRDALADSGLD TGA-L
FFDPTPNRSQIAAEC-DFDPEHEGLSPREIRMDRAAQF-AVVCTRDAVADSGLEFEQ-V
FFDPSPYRSQVAAEA-DFDPVAEGFGPRELDRMDRASQF-AVACAREFAASGLDPDT-L
FFDPAPFRSKVAAEA-DFCGL ENGLSPQEVRRMDRAAQF-AVV TAR-AVEDSGAELAA-H
FFDPTPFRSRVAAEI-DFDPEAHGLSPQEI RMDRAAQF-AVVAAR-AVADSGIDLAA-H
AFDPSPF RSRI AEC-DFDPLAEGLTPOQIRMDRATQF-AVVSARESLED SGLDLGA-L
LFDAAPYRSRIAGEI-DFDPIGGLSPRQASTYDRATQL-AVVCAREALKDSGLDPAA-V
TFDATPFRSRI AEC-DFDPVAAGLSAEQARRLD RAGQF-ALVAGQEAL TDSGLRIGE-D
TFDATPFRSRI AEC-DFDPVAAGLSAEQARRLD RAGQF-ALVAGQEALADSGLRIDE-D
LFDPSGLRSQIAAEC-DFEPSDHGLGLATAQRCDRYVQF-ALVAASEAVRDANLDMNR-E

: * : : * : : : *

Fig 2A

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KCLFDAU
KCLFPEU
KCLFACT
KCLFHIR
KCLFGRA
KCLFNOG
KCLFTCM
KCLFCIN
KCLFVNZ
KCLFWHIE
KSGRA
KSHIR
KSACT
KSCIN
KSVNZ
KSNOG
KSTCM
KSDAU
KSPEU
KSWHI

-PLEAGVITASASGGFASGQRELQNLWSKG-----PAHVSAYMSFAWFY-AVNTGQIAIR
-PLEAGVITASASGGFAFGQRELQNLWSKG-----PAHVSAYMSFAWFY-AVNTGQIAIR
TDYDMGVVTANACGGFDTHREFRKLWSEG-----PKSVSVYESFAWFY-AVNTGQISIR
PEYGTGVITSNATGGFEFTHREFRKLWAQG-----PEFVSVYESFAWFY-AVNTGQISIR
DDYDLGVVTSTAQGGFDTHREFHKLWSQG-----PAYVSVYESFAWFY-AVNTGQISIR
PEYGVGVVTASSAGGFEEFGHRELQNLWSLG-----PQYVSAYQSFADFY-AVNTGQVSIR
DEYGLGVLTAAAGAGGFEEFGQREMOKLWGTG-----PERVSAYQSFADFY-AVNTGQISIR
DPLDMGVVTASHAGGFEEFGQDELOKLLGQG-----QPVL SAYQSFADFY-AVNSGQISIR
DDFDMGVVTASASGGFEFGQELQKLWSQG-----SQYVSAYQSFADFY-AVNSGQISIR
SPYSVGVTAAAGSGGGFEFGQRELQNLWGHG-----SRHVGYPQSIADFY-AASTGQVSIR
DPSRIGVALGSASASATSLENEYLVMDSGRELVDPAHLSPMFDYLSPGVMPAEVAWA
PPERIGVSLGSASAAATSLAQEYLVLSDGGREWQVDPAYLSAHMFDYLSPGVMPAEVAWT
DPAVGVSLGSASAAATSLEREYLLLSDSGRDWEVDAAWLSRHMFYDLPVSPVMPAEVAWA
PPHRIGVVVGSAVGATMGLDNEYRVVSDGGRDLVDHRYAVPHLYNYLVPSSFAAEVAWA
DPYRVGVTVGSAGVATMGLDEEYRVVSDGGRDLVDHAYAVPHLYDMYVPSFSAEVAWA
DASRTGVVVGSAVGCTSLDEEYAVVSDSGRNWLVDDGYAVPHLYDFVPSLAAEVAVHD
NPERIGVSI GTAVGCTTGLDREYARVSEGGSRWLV DHTLAVEQLFDYFVPTSICREVAWE
SAHRVGVCVGTAVGCTQKLESEYVALSAGGANWVDPHGRAPELYDYFVPSLAAEVAVWL
SAHRVGVCVGTAVGCTQKLESEYVALSAGGAHWVDPGRGSPELYDYFVPSLAAEVAVWL
DPWRAGATLGTAVGGTTRLEHDYVLVSEGRSRWDVDRRSEPHLERAFTPATLSASAAEE



KCLFDAU
KCLFPEU
KCLFACT
KCLFHIR
KCLFGRA
KCLFNOG
KCLFTCM
KCLFCIN
KCLFVNZ
KCLFWHIE
KSGRA
KSHIR
KSACT
KSCIN
KSVNZ
KSNOG
KSTCM
KSDAU
KSPEU
KSWHI

-HDLRGPVGVVVAEQAGGLDALAHAR-RKVRGGAE-LIVSGAMDSSSLCP-YGMAAQVRSG
-HDLRGPVGVVVAEQAGGLDALAHAR-RKVRGGAE-LIVSGAVDSSSLCP-YGMAAQVKSG
-HGMRGPSALVAEQAGGLDALGHAR-RTIRRGTP-LVVS GGVDSSALDP-WGWSVQIASG
-HGLRGPVSVLVAEQAGGLDAVGHGG--AVRNGTP-MVVTGGVDSSFDLP-WGWSVSHVSSG
-NTMRGPSAALVGEQAGGLDAIGHAR-RTVRRGPG-WCSAVASTRRSTR-GASSSGLSGG
-HGLRGPVGVLTVEQAGGLDALGOAR-RQLRRGLP-MVAVAGVDGSPCP-WGWSVQIASG
-HGMRGHSSVFVTEQAGGLDAAAHAA-RLLRKGTLTALTGGCEASLCP-WGLVAQIPSG
-HGMKGPSGVVVSQAGGLDALAQAR-RLVRKGTP-LIVCGAVEPRSPAGAGSPSSPAGG
-NGMKGPSGVVVSQAGGLDAVAQAR-RQIRKGT-TRIVSGGVDSALCP-WGWSVAVHVASD
-NDFKGPVGVVVADEAGGLDALAHAA-LAVRNGTD-TVVCGATEAPLAP-YSTVCQLGYP
-AGAEGPVTMVSDGCTSGLDVSGYAV-QGTREGSADVVVAGAADTPVSPITVACFDAIKA
-VGAEGPVAMVSDGCTSGLDLSLHAC-SLIAEGTTDMVAGAADTPITPIVSCFDAIKA
-VGAEGPVTMVSTGCTSGLDVSGNAV-RAIEGSADVMFAGAADTPITPIVSCFDAIRA
-VGAEGPSTVSTGCTSGLDVAGIAY-ELVREGSVDVMVAGAVDAPISPIPI-CVLDAIKA
-VGAEGPNTVSTGCTSGLDVSGYARGELIREGSADVMLAGSSDAPISPIITMACFDAIKA
RIGAEGPVS LVSTGCTSGLDVAGRAA-DLIAEGAADVMLAGATEAPISPIITVACFDAIKA
-AGAEGPVTVSTGCTSGLDVAGYGT-ELIRDGRADVVCATDAPISPIITVACFDAIKA
-AGAEGPVNIVSAGCTSGIDSIGYAC-ELIREGTVDMVLAGGVADAPITVACFDAIRV
-AGAEGPVNIVSAGCTSGIDSIGYAC-ELIREGTVDMVAGGVADAPITVACFDAIRA
-FGVRGPVQTVSTGCTSGLDVAGYAY-HAVAEGRVDVCLAGAADSPISPIITMACFDAIKA



KCLFDAU
KCLFPEU
KCLFACT
KCLFHIR
KCLFGRA
KCLFNOG
KCLFTCM
KCLFCIN
KCLFVNZ
KCLFWHIE

RLSGSDDPDTAGYLPFDRRAAGHVPGE-GAILAVEDAERVAERG-GKVYGSIAGT-ASFD
RLSGSDNPTAGYLPFDRRAAGHVPGE-GAILTVEDAERAAERG-AKVYGSIAGYGASFD
RISTATDPDRAYLPFDERAAGYVPGE-GAILVLEDSSAAAEARGHRDAYGELAGCASTFD
RVSRATDPGRAYLPFDVAANGYVPGE-GAILLLEDAESAKARG-ATGYGEIAGYAATFD
LVSTVADPERAYLPFDVDASGYVPGE-GAVLIVEDADSARARG--AERIYVRSPLRRD
GLSTSDDPDRAYLPFDAAAGHVPGE-GALLVLESDSARARGVTRWYGRIDGYAATFD
FLSEATDPHDAYLPFDARAAGYVPGE-GAMVAERADSARERDAATVYGRIAGHASTFD
-MSDSDEPNRAYLPFDRDGRGYVPGGGRGVVPLERAEAAPARG-AEYIGE-AGPLARL-
RLSTSEEPARGYLPFDREAQGHVPGE-GAILVMEAAEAARERG-ARIYGEIAGYGSTFD
ELSRATEPDRAYLPFTEAACGFAPAEG-GAVLVVEEEAAARERG-ADVRA TVAGHAATFT

Fig 2B

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KSGRA
KSHIR
KSACT
KSCIN
KSVNZ
KSNOG
KSTCM
KSDAU
KSPEU
KSWHI

TTPRNDPAHASRPFDRNGFVLAEG-AAMFVLEEYEAQRRG-AHIYAEVGGYATRSQ
TTPRNDPEHASRPFDRNGFVLAEG-AALFVLEELEHARARG-AHVYAEISGCATRLN
TTARNDDPEHASRPFDRNGFVLAEG-AAMFVLEEDYSALARG-ARIHAEISGYATRCN
TTPRHDAPATASRPFDRNGFVLGEG-AAFFVLEELHSARRRG-AHIYAEIAGYATRSN
TINRYDDPAHASRPFDRNGFVLGEG-AAVFLVEELESARARG-AHIYAEIAGYATRSN
TTPRNDTPAEASRPFDRNGFVLGEG-AAVFLVEEFHARRRG-ALVYAEIAGFATRCN
TSANNDPAHASRPFDRNGFVLGEG-SAVFVLEELSAARRRG-AHAYAEVRGFATRSN
TSDHNDTPETLA-PFSRNRNGFVLGEG-GAIVVLEEEAAVRRG-ARIYAEIGGYASRGN
TSDHNDTPETASRPFDRNGFVLGEG-GAIVVLEEEAAVRRG-ARIYAEIGGYASRGN
TSPNNDPAHASRPFDRNGFVMEGEG-AAVLVLEEDLEHARARG-ADVCEVSGYATFGN

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KCLFDAU
KCLFPEU
KCLFACT
KCLFHIR
KCLFGRA
KCLFNOG
KCLFTCM
KCLFCIN
KCLFVNZ
KCLFWHIE
KSGRA
KSHIR
KSACT
KSCIN
KSVNZ
KSNOG
KSTCM
KSDAU
KSPEU
KSWHI

-PPPGSGRP---SALARAVETALADAGLDRSDIAVVFADGAA-VGELDVAEAEALASVFG
-PPPGSGRP---SALARAVETALADAGLDGSDIAVVFADGAA-VPELDAAEAEALASVFG
-PAPGSGRP---AGLERAI RLALNDAGTGPEVDVVFADGAG-VPELDAAEARAIGRVFG
-PAPGSRP---PALRRAI ELALADAELRPEQVDVVFADAG-VAELEDAEAAAI RELFG
-PAPGSGRP---PALGRAAEALAEAGLTPADISVVFADGAG-VPELDRAEADTLARLFG
-PPPGSGRP---PNLLRAAQALDDAEVGP EAVDVVFADAG-TPEDAEAEADAVRRLFG
-ARPGTGRP---TGPARAI RLALAEARVAPEDVDVVFADAG-VPALDRAEAEALAEVFG
-PAPHSRG---STRAHAIR TALDDAGTAPGDIRRVFADGGGRYPN-DRAEAEAI SEVFG
-PRPGSGRE---PGLRKAI ELALADAGAAPGDI DVVFADAAA-VPELDRVEAEALNAVFG
GAGRWAESR---EGLARAI QGALAEAGCRPEEVDVVFADALG-VPEADRAEALALADALG
-AYHMTGLKKGREMAESIRALDEARLDRTAVDYVNAHGSG-TKQNDRHETA AFKRS LG
-AYHMTGLKTDGREMAEAI RVALDLARIDPTDIDYINAHGSG-TKQNDRHETA AFKRS LG
-AYHMTGLKADGREMAETIRVALDESRTDATDIDYINAHGSG-TQNDRHETA AYKRS LG
-AYHMTGLR-DGAEMAEAI RLALDEARLNPEQVDYINAHGSG-TKQNDRHETA AFKRS LG
-AYHMTGLRDPDGAEMAEAI RVALDEARMNPTEIDYINAHGSG-TKQNDRHETA AFKRS LG
-AFHMTGLRDPDGREMAEAI GVALAQAGKAPADVYVNAHGSG-TQNDRHETA AFKRS LG
-AFHMTGLKPDGREMAEAI TAALDQARRTGDDLHYINAHGSG-TQNDRHETA AFKRS LG
-AYHMTGLRADGAEMAAAI TAALDEARRDP SDVDYVNAHGTA-TQNDRHETA SAFKRS LG
-AYHMTGLRADGAEMAAAI TAALDEARRDP SDVDYVNAHGTA-TQNDRHETA SAFKRS LG
-AYHMTGLTKEGLEMARAI DTALDMAELDGSADYVNAHGSG-TQNDRHETA AVKRS LG

. : * : : * . . * : : *

Fig 2c

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P--HRVPVTVPKTLTGRLYSGAGPLDVATGLLALRDEVVPATGHVH-PDPDLPLDVVTGR
P--RRVPVTVPKTLTGRLYSGAGPLDVATALLALRDEVVPATAHVD-PDPDLPLDVVTGR
R--EGVPVTVPKTTTGRLYSGGGPLDVVTALMSLRBGVIAPTAGVTSVPREYGIDLVLGE
P--SGVPVTAPKIMTGRLYSGGGPLDLVAALLAIRDGIPTVHTAEFVPEHQDLVLTGD
P--RGVPVTAPKALTGRLCAGGGPADLAAALLALRDQVIPTATGRHRAVPDAYALDLVTGR
P--YGVVPTAPKIMTGRLYSAGGAALDVATALLALRQGVPTVNSRPREYELDLVLA-
P--GAVFVTAPKIMTGRLYSAGGAALDVATALLSIRDCVVPPTVGTGAPAGLIDLVLHQ
P--GRVPVTCPRMTGRHLHSGAAPLDVACALLAMRAGVIPTVHID-PCPEYDLDLVLQYQ
T--GAVFVTAPKIMTGRLYSGAAPLDLAAAFAMDEGVIPTVNVE-PDAAAYGLDLVVG
PHAARVPVTAPKIGTGRAYCAAPVLDVATAVLAMEHGLIPTPHVL--DVCHDLDLVTGR
EHAYAVPVSSIKSMGGHSLGAIGSIEIAASVLAIEHNVVPTANLHTPDPECDLDYVPLT
EHAYRTPVSSIKSMVGHSLGAIGSIEVAACALAIHGVVPTANLHEPDPECDLDYVPLT
EHARRTPVSSIKSMVGHSLGAIGSLEIAACVLALEHGVVPTANLHTSDPECDLDYVPLE
EHAYRTPVSSIKSMVGHSLGAIGSIEIAASALAMEYDVVPTANLHTPDPECDLDYVPLT
DHAYRTPVSSIKSMVGHSLGAIGSIEIAASALAMEHNVVPTGNLHTPDPECDLDYVR-S
DHAYRVPVSSIKSMIGHSLGAIGSLEIAASVLAITHDVVPTANLHEPDPECDLDYVPLR
QRAYDVPVSSIKSMIGHSLGAIGSLELAACALAIHGVIPPTANYEEDPECDLDYVPNV
DHAYRVPISSVKSMIGHSLGAAGSLEVAATALAVEYGAIPPTANLHDPDPPELDLDYVPLT
EHAYRVPISSVKSMIGHSLGAVGSLEVAATALAVEYGVIPPTANLHDPDPPELDLDYVPLT
EHAYATPMSSIKSMVGHSLGAIGSIEIAACVLAHMAHQVVPPTANYTTDPPECDLDYVPRE

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PRAMADARAALVVARHGGFNSALVVRGAA-----
PRSLADARAALLVARGYGGFNSALVVRGAA-----
PRSTAPRTA-LVLARGRWGFNSAAVLRRFAPTP---
PRHQQLGTA-LVLARGKWGFNSAVVVRGVVG-----
PREAALSAA-LVLARGRHGFNSAVVVTLRGSDHRRPT
PRRTPLARA-LVLARGRGGFNAAMVAGPRAETR---
PRELRVDTA-LVVARHGGGFNSALVVRRHG-----
VRPAALRTA-LGGARGHGGGFNSALVVRAGQ-----
PRTAEVNTA-LVLARGHGGGFNSAMVVRSAN-----
ARPAEPRTA-LVLARGLMGSNSALVLRGAVPPEGR-
AREQVRDVT-LTVGSGFGGFQSAMVLRHREEAA----
AREQVRDVT-LSVGSGFGGFQSAMVLRRLGGANS---
ARERKLRSV-LTVGSGFGGFQSAMVLRDAETAGAAA-
ARDQRVDSV-LTVGSGFGGFQSAMVLTSAQ-----RSTV
CREQLTDSV-LTVGSGFGGFQSAMVLRARPE---RKIA
ARACFVDVT-LTVGSGFGGFQSAMVLCGPGSGRGSAA
AREQVRDVT-LSVGSGFGGFQSAAVLARPKETRS---
AREKVRHA-LTVGSGFGGFQSAMLLSRPER-----
AREKVRHA-LTVGSGFGGFQSAMLLSRLER-----
ARERTLRHV-LSVGSGFGGFQSAVVLSGSEGGRL---
*          *          *          *          :
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mole:-/ks2%

Fig 2D

Fig 3

m: malonyl transferase
mm: methylmalonyl transferase
em: ethylmalonyl transferase
C2: unknown C2 unit transferase

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Fig. 4A

	1				50
niddamycin	-----	-----	MAGHGDATAQ	KAQDAEKSED	GSDAIAVIGM
platenolide	-----	-----	-----MS	GELAISRSD	RSDAVAVVGM
monensin	-----	-----	-----MAAS	ASASPSGPSA	GPDPIAVVGM
oleandomycin	-----	-----	-----	---MHVPGEE	NGHSIAIVGI
tylosin	MSSALRRVQ	SNCGYGDLMT	SNTAAQNTGD	QEDVDGPDST	HGGEIAVVGM
	51				100
niddam...	SCRFPGAPGT	AEFWQLSSG	ADAVVTAADG	RRR.....	.....GTIDA
platenol.	ACRFPGAPGI	AEFWKLLTDG	RDAIGRDADG	RRR.....	.....GMIEA
monensin	ACRLPGAPDP	DAFWRLLESEG	RSVSTAPPE	RRRADSGLHG	P...GGYLDR
oleandom	ACRLPGSATP	QEFWRLLADS	ADALDEPPAG	RFPTGSLSSP	PAPRGGFLDS
tylosin	SCRLPGAAGV	EEFWELLRS	RGMPTRQDDG	TWRAA.....	.....LED
	101				150
niddam...	PADFDAFFG	MSPREAAATD	PQORLVLELG	WEALEDAGIV	PESLRGEAAS
platenol.	PGDFDAFFG	MSPREAAETD	PQORLMLELG	WEALEDAGIV	PGSLRGEAVG
monensin	IDGFDADFFH	ISPRAVAMD	PQORLLELS	WEALEDAGIR	PPTLARSRTG
oleandom	IDTFDADFFN	ISPRAEAGVLD	PQORLLELG	WEALEDAGIV	PRHLRGTRTS
tylosin	HAGFDAGFFG	MNARQAAATD	PQHRLMLELG	WEALEDAGIV	PGDLTGTDG
	151				200
niddam...	VFVGAMNDY	ATLLH.RAGA	PTDTYTATGL	QHSMIANRLS	YFLGLRGPSL
platenol.	VFVGAMHDDY	ATLLH.RAGA	PVGPHATATGL	QRAMLNRLS	YVLGTRGPSL
monensin	VFVGAFWDDY	TDVLNLRAPG	AVTRHTMTGV	HRASILANRLS	YAYHLAGPSL
oleandom	VFMGAMWDDY	AHLAHARGE	ALTRHSLTGT	HRGMIANRLS	YALGLQGPSL
tylosin	VFAGVASDDY	A.VLTRRSV	SAGGYTATGL	HRALANRLS	HFLGLRGPSL
	201				250
niddam...	VVDTGQSSSL	VAVALAVESL	RGGTSGIALA	GGVNLVLAEE	GS.AAMERVG
platenol.	AVDTAQSSSL	VAVALAVESL	RAGTSRVAVA	GGVNLVLADE	GT.AAMERLG
monensin	TVDTAQSSSL	VAVHLACESI	RGSDSDIAFA	GGVNLICSPR	TTELAAARFG
oleandom	TVDTGQSSSL	AAVHMACESL	ARGESDLALV	GGVNLVLDPA	GT.TGVERFG
tylosin	VVDSAQSASL	VAVQLACESL	RRGETSLAVA	GGVNLILTEE	ST.TVMERMG
	251				300
niddam...	ALSPDGRCHT	FDARANGYVR	GEGGAIVVLK	PLADALADGD	RVYCVVRGVA
platenol.	ALSPDGRCHT	FDARANGYVR	GEGGAIVVLK	PLADALADGD	PVYCVVRGVA
monensin	GLSAAGRCHT	FDARADGFVR	GEGGGLVVLK	PLAAARRDGD	TVYCVIRGSA
oleandom	ALSPDGRCHT	FDSRANGYAR	GEGGVVVVLK	PTHRALADGD	TVYCEILGSA
tylosin	ALSPDGRCHT	FDARANGYVR	GEGGGAIVVLK	PLDAALADGD	RVYCVIKGGA
	301				350
niddam...	TGNDGGGPGL	TVPDRAGQEA	VLRAACDQAG	VRPADVRFVE	LHGTGTPAGD
platenol.	VGNDGGGPGL	TAPDREGQEA	VLRAACAQAR	VDPAEVRFVE	LHGTGTPVGD
monensin	VNSDGTDDGI	TLPSGQAQD	VVRLACRRAR	ITPDQVQYVE	LHGTGTPVGD
oleandom	LNNDGATEGL	TVPSARAQAD	VLRQAWERAR	VAPTDVQYVE	LHGTGTPAGD
tylosin	VNNDGGGASL	TTPDREAQEA	VLRQAYRRAG	VSTGAVRYVE	LHGTGTRAGD

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	351		400
niddam...	PVEAEALGAV YGTGRP..AN EPLLVGSVKT NIGHLEGAAG	IAGFVKAALC	
platenol.	PVEAHALGAV HGSGRP..AD DPLLVGSVKT NIGHLEGAAG	IAGLVKAALC	
monensin	PIEAAALGAA LGQDAA..RA VPLAVGSAKT NVGHLEAAAG	IVGLLKLTALS	
oleandom	PVEAEGLGTA LGTARP..AE APLLVGSVKT NIGHLEGAAG	IAGLLKTVLS	
tylosin	PVEAAALGAV LGAGADSGRS TPLAVGSVKT NVGHLEGAAG	IVGLIKATLC	
	401		450
niddam...	LHERALPASL NFETPNPAIP LERLRLKVQT AHAALQPGTG	GGPLLAVGSA	
platenol.	LRERTLPGSL NFATPSAIP LDQLRLKVQT AAAELPLAPG	GAPLLAGVSS	
monensin	IHHRR LAPSL NFFTNPNAIP LADLGLTVQQ DLADWP..RP	EQPLIAGVSS	
oleandom	IKNRHLPASL NFTSPNPRID LDALRLRVHT AYGPWP..SP	DRPLVAGVSS	
tylosin	VRKGELVPSL NFSTPNPDIP LDDLRLRVQT ERQEW.NEED	DRPRVAGVSS	
	451		500
niddam...	FGMGGTNCHV VLEETPGG.. .....	...RQPAE.T	
platenol.	FGIGGTNCHV VLEHLPSR.. .....	...PTPAV.S	
monensin	FGMGGTNCHV VVA....AAP DSVAVPEPVG VPERVEVPEP	VVVSEPVVVP	
oleandom	FGMGGTNCHV VLSELRNAGG DGAGKGPYTG TEDRLGATEA	EKRDPDPATGN	
tylosin	FGMGGTNVHL VIAEAPAAAG SSGAGGSGAG SGAGISAVSG	VV.....	
	501		550
niddam...	GQADACLFSA SPMLLLSARS EQALRAQAAR LREHL..EDS	GADPLDIAYS	
platenol.	VAAS...LPD VPPLLLSARS EGALRAQAVR LGETV..ERV	GADPRDVAYS	
monensin	TPWP..... ..VSAS ASALRAQAGR LRTHLAHRP	TPDAARVGHA	
oleandom	GPDPAQDTHR YPALILSARS DAALRAQAER LRHHL.EHSP	GQRLRDTAYS	
tylosin	..... ..PVVVSGRS RVVVREAAGR LAE..VVEAG	GVGLADVAVT	
	551		600
niddam...	LATTRTRFEH RAAVPCGDPD RLSSALAALA AGQTPRGVRI	GS..TDADGR	
platenol.	LASTRTLFEH RAVVPCGGRG ELVAALGGFA AGRVSGGVRS	GR..A.VPGG	
monensin	LATTRAPLAH RAVLLGGDTA ELLGSLDALA EGAETASIVR	GEAYT..EGR	
oleandom	LATRRQVFER HAVVTGHDRE DLLNGLRDLE NGLPAPQVLL	GRTPTPEPGG	
tylosin	MAD.RSRFGY RAVVLARGEA ELAGRLRALA GGDPDAGVVT	G...AVLDGG	
	601		650
niddam...	LALLFTGQGA QHPGMGQELY TTDPHFAAAL DEVCEELQRC	GTQNLREVMF	
platenol.	VGVLFTGQGA QWVGMRGLY AGGGVFAEVL DEVLSMVGEV	DGRSLRDVMF	
monensin	TAF LFSGQGA QRLGMGRELY AVFPVFADAL DEAFALDVH	LDRPLREIVL	
oleandom	LAFLFSGQGS QQPGMGKRLH QVFPGFRDAL DEVCAELDTH	LGRL.....	
tylosin	VVGAAPGGA GAAGGAGAAG GAGGGGVVLV FPGQGTQWVG	MGAGLLGSSE	
	651		700
niddam...	TPDQPD....	LLDRTEYTQP	ALFALQTALY
platenol.	GDVDVDAGAG ADAGAGAGAG VGSGSGSVGG LLGRTEFAQP	ALFALEVALF	
monensin	GETDSGGNVS GENVIGEGA. ....DHQA LLDQTAYTQP	ALFAIETSLY	
oleandom	.GPEAGPPLR DVMFAERGT. ....AHSA LLSETHYTQA	ALFALETALF	
tylosin	VFAASMRECA RALSVHVGWD LLEVSGGAG .LERVDVVQP	VTWAVMVSLA	
	701		750
niddam...	RTL TARGTQA HVLVGH SVGE ITAAHIAGVL DLPDAARLIT	ARAHVMGQLP	
platenol.	RALEARGVEV SVVLGH SVGE VAAATVAGVL SLGDAVRLVV	ARGGLMGGLP	
monensin	RLAASFGLKP DYVLGH SVGE IAAAHVAGVL SLPDASALVA	TRGRMLQAVR	
oleandom	RLLVQWGLKP DHLAGH SVGE IAAHAAGIL DLSDAAE LVA	TRGALMRSLP	
tylosin	RYWQAMGVDV AAVVGH SQGE IAAATVAGAL SLEDAAVVA	LRAGLIGRYL	

Fig 4B

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	751		800
niddam...	HG.GAMLSVQ	AAEHDLDQLA	HTHG..VEIA
platenol.	VG.GGMWSVG	ASESVVRGVV	EGLGEWVSVA
monensin	AP.GAMAAWQ	ATADEAAEQ	AGHERHVTVA
oleandom	GG.GVMLSVQ	APESVAPLL	LGREAHVGLA
tylosin	AGRGAMAAVP	LPAGEVEAGL	.AKWPGVEVA
			AVNGPTHCVL
			SGPRTALEET
			SGDVGVLESV
			SGDRATVDEL
			SGERGHVAAI
			SGDRRAVAGY
	801		850
niddam...	AQHLREQNVR	HTWLKVSHAF	HSALMDPMLG
platenol.	VASLMGDGVE	YRRLDVSHGF	HSVLMPEVLG
monensin	TAAWRGRGRK	AHHLKVSHAF	HSPHMDPILD
oleandom	EQILRDRGRK	SRYLRVSHAF	HSPLMPEVLE
tylosin	VAVCQAEVQ	ARLIPVDYAS	HSRHVEDLKG
			ELERVLSGI.
			.RPRSPRPV
	851		900
niddam...	ISNLTGQIA.	.....DPNHL	CTPDYWIDHA
platenol.	VSGVSGGVV.	.....GSGEL	GDPGYWVRHA
monensin	VSNVTGELVT	ATATGSGAGQ	ADPEYWARHA
oleandom	VSNLTG....	..APVDDRTM	ATPAYWVRHV
tylosin	CSTVAGEQPG	EPVF.....	.DAGYWFRNL
			RNRVEFSAVV
			GGLLEEGRH
	901		950
niddam...	YLEIGPHPTL	TTLHHTL..	.DNP.....
platenol.	LVEVGPHGVL	TGMAGECLGA	GDDV.....
monensin	FVELGPDAPL	SAMARDCFPA	P.....
oleandom	FLEVGPDGVL	TAMARACVTA	APEPGHRGEQ
tylosin	FIEVSAHPVL	V.....	.....HAIEQ
			TAEAADRSVH
			ATGTLRRQDD
	951		
niddam...	EPETLTQAIA	AVGVRTDGID	WAVLCGASRP
platenol.	EREVFEEAALA	TVFTRDAGLD	ATALHTGSTG
monensin	EVATFLRSLA	QAYVRGADVD	FTRAYGATAT
oleandom	EARSLTEAVA	RLHLHGVPMD	WTSVLGGDVS
tylosin	SPHRLLTSTA	EAWAHGATLT	WDPAL..PPG
			HLTTLPTYPF

niddam: niddamycin; platenol: platenolide I (spiramycin); oleandom: oleandomycin.

FIG. 4C

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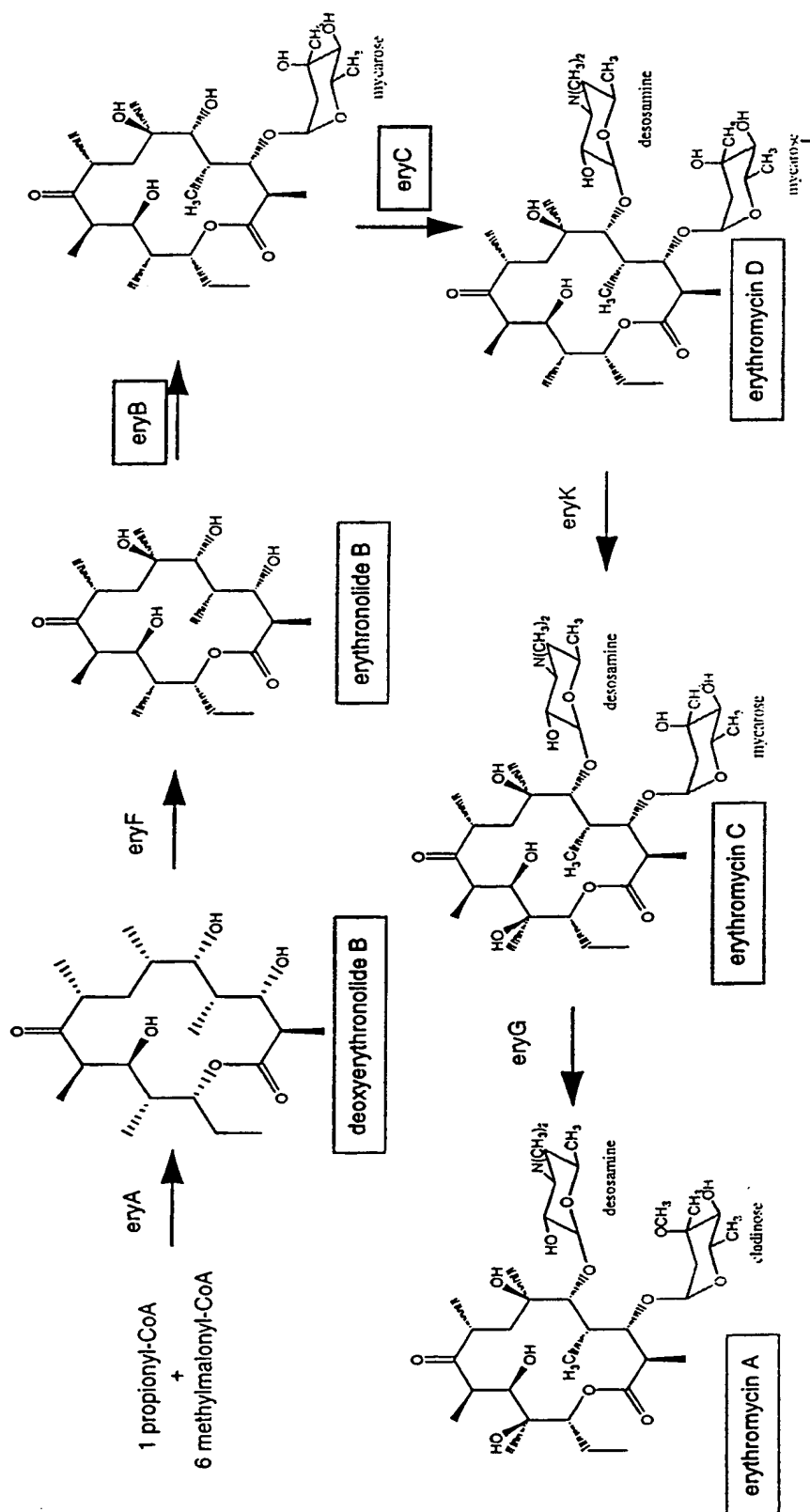


Fig. 5

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TEFBD" T4B02/60

Figure 7

forward (Plf):

5'-CTA GGC CGG GCC GGA CTG GTA GAT CTG CCT ACG TAT CCT TTC CAG GGC AAG CGG TTC TGG CTG CAG CCG GAC CGC ACT AGT CCT CGT GAC GAG

GGA GAT GCA TCG AGC CTG AGG GAC CGG TT-3'

backward (Plb):

5'-AAC CGG TCC CTC AGG CTC GAT GCA TCT CCC TCG TCA CGA GGA CTA GTG CCG TCC GGC TGC AGC CAG AAC CGC TTG CCC TGG AAA GGA TAC GTA

GGC AGA TCT ACC AGT CCG GCC CGG C-3'

oligos annealed:

CTAGCCCGGCGGACTGTAGATCTGCCTACGTATCCTTTCCAGGGCAAGCGGTTCTGGCTGCAGCCGACCCGCACTAGTCTCTGTGACGAGGAGATGCATCGAGCCCTGAGGACCGGTT

CGGCCCGGCGGCGGACTGTAGATCTGCCTACGTATCCTTTCCAGGGCAAGCGGTTCTGGCTGCAGCCGACCCGCACTAGTCTCTGTGACGAGGAGATGCATCGAGCCCTGAGGACCGGTT

AvrII	BglII	SnaBI	PstI	SpeI	NsiI	Bsu36I	HpaI
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